

REMARKS

Claims 1 – 27 are pending in the application. Claims 10 – 12, 14, 15, and 17 – 26 stand withdrawn as drawn to a non-elected invention; claim 1 was previously noted as being a generic claim. The office action rejected claims 1-9, 13, 16, and 27 under 35 U.S.C. 112, first paragraph, and under 35 U.S.C. 103(a) as being unpatentable over *Balamuth*. Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over *Balamuth* in view of *Andersson et al.* The cited references have been reviewed, and applicant requests that the following arguments be considered in traversing these rejections. Further examination of the application and reconsideration of the rejections are respectfully requested.

Appended Literature

Applicant requests consideration of the literature referenced in the Information Disclosure Statement accompanying this response. The literature illustrates the level of ordinary skill of one skilled in the art regarding power sensitive tips, how tip breakage occurs, and the manufacturer's suggest power ranges for use with the power sensitive tips. Although some of these references may postdate applicant's filing date, they may be relied upon to show the level of ordinary skill in the art at or around the time the invention was made. Ex parte Erlich, 22 USPQA 1463 (Bd. Pat. App. & Inter. 1992). MPEP 2141.03.

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The appended literature illustrates the types of problems encountered in the art (breakage) and the prior art solutions to those problems (suggested power settings). Specifically, Walmsley et al. indicates that certain ultrasonic tips can break when used at maximum power; Kobayashi et al. indicates breakage for fine ultrasonic files when using a weak power setting; Walsh et al. indicates that using a high power setting can result in tip breakage for some ultrasonic tips; "Powering the Calculus Away" describes the standard industry use of power settings, and indicates that half power is the maximum for slim style tips; "Roots Summit 4" also indicates that high power settings will result in tip breakage for certain tips (see pages 4 and 5). Dr. Jeffrey F. Carlson, teaching at the University of Minnesota, indicates that there is concern with tip breakage and that less than mid-power should be used with "slimline" tips (see page 6). The Hu-Friedy and Cavitron product literature indicate that manufacturer's are aware of tip breakage and therefore recommend reduced power settings. For example, the Cavitron directions for use have a unit power settings section that specifies "TFI®-EWPP, P-105, PEC, PEC-2, FSI® SLIMLINE®-10S, L&R and SLIMLINE®-10S, L&R inserts should be used up to medium power" and that "All other Cavitron inserts may be used up to maximum power."

Many ultrasonic dental tips can be used at a full power setting on the potentiometer knob on the ultrasonic generator unit that is used to supply power to

the tip. However, the skilled artisan readily appreciates that some tips are sensitive to the power range of the generator, and must be used at a lower power setting or the tips will break very quickly (see "Roots Summit 4" at pages 3 – 5; *Walsh et al.*, abstract lines 11 – 12) or otherwise cause problems with using the tips. For these power-sensitive tips, the manufacturers advise using a "low or medium power setting." These tips are clearly identified by their manufacturers. See the *Hu-Friedy* and *Cavitron* product literature, for example. Applicant's invention reduces the efficiency of the insert to which the tip is coupled in the handpiece so that the dental practitioner no longer needs to reduce the power setting to use different tips, and the manufacturer no longer needs to warn the practitioner about overpowering the power-sensitive tips. Applicant's invention automatically attenuates the power delivered to the tip in accordance with the power sensitivity of the tip relative to the ultrasonic generator output, and represents a substantial improvement over the prior art.

§ 112 Rejections

Applicant respectfully traverses the 35 U.S.C. 112, first paragraph, rejections and believes that the allegedly indefinite terms are adequately defined in the specification so that one skilled in the art can readily ascertain the scope of the claims and that applicant had possession of the claimed invention at the time the application was filed. The office action asserts that the application fails to comply

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with the written description requirement as it does not describe how the power sensitivity of the tip is determined in order to be matched with the efficiency of the magnetostrictive element, and that it does not describe how the efficiency of the magnetostrictive element is determined in relation to the power range of the tip.

Power sensitive tips having a power range are well known in the industry. The appended literature and applicant's specification at paragraph [0004] illustrate that it is well understood by a person skilled in the art how to determine the power sensitivity or power range of a tip. Every dental practitioner using ultrasonic devices already does this when the power control knob is set to less than full power. Manufacturers are already doing this since they must determine the power range of a tip when they recommend a low or medium power setting for a particular tip. In recommending specific power settings or power ranges for the power sensitive tips, those in the industry surely have acknowledged power sensitivity and have illustrated that it is known how to determine the power range of a tip so as to avoid tip breakage and to extend the life of the tip.

Applicant's invention, by pairing the tip with the efficiency of the magnetostrictive element, solves the dental practitioner's problem of inadvertently overpowering the tip by reducing the magnetostrictive element's efficiency relative to a conventional handpiece so that there is less than 50% conversion of the power to the handpiece into motion of the tip. In general, the power conversion is

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proportional to the amount of magnetostrictive material in the handpiece insert at the resonant frequency, and can be readily determined by those skilled in the art such as ultrasonic equipment manufacturers.

Every nuance of applicant's claims need not be explicitly described in the specification, as the skilled artisan would have understood applicant to be in possession of the claimed invention at the time of filing. MPEP 2163(II)(A)(3)(a). Applicant has shown that power sensitivity was known to a person skilled in the art, as discussed above. Applicant also clearly discloses how the efficiency of the magnetostrictive element can be modulated; see paragraphs [0030] to [0041] of the specification. To practice applicant's invention, one skilled in the art matches the power sensitive tip with the appropriate efficiency modulated magnetostrictive element, such that the tip is not overpowered at the maximum power output of the adjustable power supply (claim 1). Applicant was thus in possession of the invention at the time of filing the application. See MPEP 2163 et seq.

Applicant believes that the specification and claims, as written, clearly define and claim the invention, and thus comply with the written description requirement. Withdrawal of the rejections under 35 U.S.C. 112, first paragraph, is respectfully requested.

§ 103 Rejections under *Balamuth*

By way of background, applicant's invention is directed to power modulation of an ultrasonic dental device to avoid overpowering the sensitive tips used in the handpiece. The office action appears to have confused frequency and amplitude or power. The current supplied to the handpiece is an alternating current. The frequency of the current must match the resonant frequency of the handpiece, magnetostrictive element, transducer and tip. If the frequency of the current to the handpiece is not close to the resonant frequency, there will be no vibration or oscillatory motion. When the current is supplied at the resonant frequency, the amplitude of the alternating current will determine the power that is supplied to the handpiece and converted to oscillatory vibration, i.e. more power or amplitude will result in more oscillatory motion. If this power or amplitude is too great, a sensitive tip can break. Applicant's invention is directed to modulating the power to prevent tip breakage, but generally does not change the operating or resonant frequency. See the specification at paragraphs [0002 – 0004] and [0006].

Claim 1 was rejected under 35 U.S.C. 103(a) as being obvious in view of *Balamuth*. The office action concedes that *Balamuth* does not teach that the magnetostrictive element is matched with the power sensitivity of the tip, as claimed by applicant. To establish *prima facie* obviousness of a claimed invention,

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all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

The obviousness rejection asserts that it would have been an obvious matter of choice to have the magnetostrictive element and tip of the insert operate so as to not break the insert or impart vibrations that are destructive. The literature submitted with this reply illustrates the type of problem encountered in the art – tip breakage – and the current and prior art solutions to the problem – suggested power settings. Applicant concedes that the use of suggested power settings to avoid tip breakage has been utilized in the industry for several years, as the literature illustrates. As the common industry solution is to limit the power setting by turning the knob on the ultrasonic generator, it would not have been obvious to modify the magnetostrictive element.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP § 2142-2143.03. Appellant respectfully submits that the *Balamuth* fails to establish a *prima facie* case of obviousness with respect to claim 1 as there was no motivation to modify the *Balamuth* as suggested, and further because there was a long-standing practice to suggest power settings so as to avoid tip breakage.

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It is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the art having the reference before him to make the proposed modification. In re Linter, 458 F. 2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Ultrasonic tip inserts come in a wide variety of shapes and sizes. The power range that can be safely used with the tips varies according to the shape and size. The literature submitted with this reply illustrates the types of problems encountered in the art (i.e. tip breakage) and the prior art solutions to those problems (i.e. suggested power settings). *Balamuth* alone or in combination with the standard industry practices fails to teach matching the power efficiency of the magnetostrictive element with the power sensitivity of the tip.

The mere fact that a reference can be modified does not render the modification obvious unless the prior art also suggest the desirability of the modification. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The prior art did not suggest the desirability to modify the magnetostrictive element, rather the standard in the industry was to suggest low to medium power settings so as to avoid tip breakage.

Balamuth teaches the desire to operate at peak efficiency, and at maximum energy conversion. See *Balamuth*, column 8, lines 69 – 72, and column 9, lines 72 – 75. Thus, *Balamuth* teaches away from operating at less than optimal efficiency. Additionally, using conventional wisdom, one would want to operate at optimal

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efficiency; applicant, in modifying the magnetostrictive element, was proceeding contrary to accepted wisdom in the art, which is itself further evidence of non-obviousness. In re Hedges, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986). The proposed modification to operate at less than peak efficiency would also change the principle of operation of the invention in *Balamuth*: by not operating at peak efficiency, the modification requires a revolutionary redesign of the magnetostrictive elements, and is thus not sufficient to render the claims *prima facie* obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

By the arguments presented above, it has been shown that *Balamuth* would not have rendered applicant's claimed invention obvious. Applicant further contends that, in rejecting the claims as an 'obvious matter of choice' in view of *Balamuth*, the office action erroneously applies an "obvious to try" rationale, or that impermissible hindsight was used. No reference or other evidence has been cited in the office action to support this assertion in the office action, and applicant respectfully requests that this assertion be supported by evidence. See 37 C.F.R. § 1.104(d)(1) and (2).

Thus, it is submitted that *Balamuth* does not disclose or teach an efficiency-modulated magnetostrictive element, nor that the efficiency modulation is matched with the sensitivity of the tip. *Balamuth* fails to teach or suggest the subject matter of claim 1.

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Claims 2-4, 6, 7 and 13 properly depend from claim 1, which would not have been obvious, as illustrated by the arguments presented above. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). MPEP 2143.03.

Additionally with respect to claims 2-4, 6, 7 and 13, *Balamuth* does not show the element having an efficiency rating less than 50 percent. *Balamuth* discloses only the desire to operate at the optimal efficiency rating (see column 8, lines 64-75; column 9, lines 59-63; column 9, lines 72-75). *Balamuth* states that it is important to limit the amount of ultrasonic vibrational energy so that an over zealous user may not wear away the surface or damage the gum structure, accomplished by using components designed to be of self-limiting vibrational energy transmitters (column 6, lines 57-66). *Balamuth* does not disclose less than optimal energy conversion; however, the size of the generator may be limited to as small as 1 to 10 watts in the ultrasonic motor (column 8, lines 28-29), which appears to be the method by which *Balamuth* limits the amount of ultrasonic vibrational energy. In contrast to *Balamuth*, applicant's invention can limit the efficiency of energy conversion so as to protect a power-sensitive tip that would otherwise be damaged when used with a controller having a variable power output

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where the maximum power setting exceeds the power range of the power-sensitive tip.

§ 103 Rejection under *Balamuth* in view of *Andersson*

Referring to claim 27, a rejection under 35 U.S.C. §103(a) is not proper as each element of the rejected claim does not appear within the proposed combination of *Balamuth* and *Andersson*, nor do the references suggest the invention. *Andersson* discloses a method for adjusting the power to an ultrasonic dental insert by use of a control switch, where the power control switch has a maximum power setting. Applicant also utilizes an adjustable power supply having a maximum power setting. However, applicant matches the efficiency of the magnetostrictive element with the power-sensitive tip so as to allow a user to apply the full range of power available without fear of damaging a power-sensitive tip that would otherwise be damaged at full power and full efficiency. The apparatus of *Andersson* allows one to adjust the power control to full power, but does not disclose any measures that can be used to protect power-sensitive tips, as claimed by applicant.

For the reasons set forth above, it is respectfully submitted that *Balamuth* and *Andersson*, alone or in combination, do not anticipate, teach, suggest or render the claimed invention of the present application obvious. Therefore, withdrawal of the

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claim rejections under 35 U.S.C. 103(a) over these references is respectfully requested.

By the arguments above, applicant believes that generic linking claim 1 is allowable. Since the restriction requirement, as set forth in the Office Action mailed on September 23, 2004 was conditioned on the nonallowance of the linking claim, applicant respectfully requests that the restriction requirement as to the linked inventions be withdrawn and the claims to the non-elected species be rejoined. MPEP 809.04.

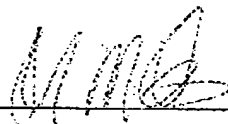
During the course of these remarks, Applicant has at times referred to particular limitations of the claims which are not shown in the applied prior art. This short-hand approach to discussing the claims should not be construed to mean that the other claimed limitations are not part of the claimed invention. Consequently, when interpreting the claims, each of the claims should be construed as a whole, and patentability determined in light of this required claim construction. Unless Applicant has specifically stated that an amendment was made to distinguish the prior art, it was the intent of the amendment to further clarify and better define the claimed invention.

If the Examiner has any questions or comments regarding this communication, he is invited to contact the undersigned directly to expedite the resolution of this application. Further examination of the application and

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reconsideration of the claims as originally presented and the allowance thereof is respectfully requested.

Respectfully submitted,



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